Viewdata—a Review

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A brief review of the Post Office's Prestel service, including hardware, input, costs, search strategy and developments abroad and in the future.

Introduction

In the early 1970s both BBC and the IBA were working on a practical teletext system, in which information is transmitted along with the conventional programme signal. A sequence of pages of information is continuously transmitted and an individual page can be selected by the user who, on average, has to wait 12·5 seconds for a given page to appear. The BBC service has been given the acronym CEEFAX, and the IBA service, ORACLE. Both were available publicly in 1975.

At the same time that teletext was being developed, the Post Office was working on some problems associated with the presentation of alpha-numeric data on viewphones. It soon became apparent that the technology existed to provide an information service by a combination of the telephone and the television set, both of which remain unused for long periods of the day. The service was given the generic name 'viewdata'. However, this could not be registered as a trade mark, and so the Post Office has now adopted the name Prestel for its public viewdata service.

The basic principle of viewdata is that the encoded information is transmitted down the telephone line, which is linked into a standard 625-line television using a special modem. The information is stored on a minicomputer, which can be interrogated using a numeric, or alpha-numeric keypad attached to the modem. Viewdata is therefore an on-line, interactive information service, and as such demands a careful appraisal by both the providers and users of information. The three main differences between Prestel and services such as Dialog or Orbit are:

1. Prestel uses a distributed network of minicomputers instead of a very large main-frame computer.
2. A 'tree' search strategy is used, Boolean operators are not available, and inverted files cannot be set up.
3. A different screen format is used, which can accommodate both colour and graphic displays.

The information is stored in pages, each of which has a unique numeric designation. Each page may itself take several 'frames' (in theory, up to 26) to be displayed on the television. Using index pages, the user can select

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from up to 10 choices (0–9) which page he wishes to see next. There are also * and = keys on the basic keypad which can be used to roll forward or back a frame, and to provide a few search short-cuts. A detailed description of the hardware, software and operation has been provided by S. Fedida,[1–8] who headed the Post Office research effort on viewdata, and by Davis[9] and Clarke.[10] An introduction to the general principles of teletext information services has been given by Cawkell.[11] A bibliography of the literature published between 1974 and 1976 has been compiled by MacCafferty,[12] and a rather selective bibliography of more recent references has been published in *Online Review*.[13] The development of Prestel in the United Kingdom is a three-way combined operation by the Post Office, the television manufacturing industry and the information industry. The role each plays in the service is as follows.

Post Office

The Post Office sees Prestel as both improving the utilization of the telephone system, and also as a direct source of revenue. A network of GEC 4080 mini-computers is being established so that, when fully operational, any user will only be a local telephone call away from a computer. Each computer will contain both those data-bases of national interest, as well as those of regional importance. The computers are connected into the telephone exchange, and thence into the user's home or office. The signal is decoded by a modem which will initially be an integral part of the television, though no doubt 'adaptors' will soon become available. The incoming signal is at 1,200 bits/second, and the user response is returned at 75 bits/second, operating in full-duplex. The design of the modem is such that a television suitable for receiving a viewdata signal will also receive teletext broadcasts, though the converse is not true. The Prestel service can also be linked in with the existing telex network.

Television Industry

Faced with Japanese imports, the UK television industry sees the advent of Prestel as a new market for colour television sets for the domestic market, as well as a new market for monochrome sets in the business environment. Two basic types of television are envisaged as follows:

Domestic	*Business*
26 in. screen	12–14 in. screen
Colour	Monochrome
Remote keypad	Integral keyboard

The keypad would be the numeric version mentioned previously, operating by ultrasonic or infrared remote sensing. Business users may like the use of a full QWERTY keyboard, especially when the message-transmission becomes available. The information provider will be offered a full editing keyboard, with off-line local data storage, and also a graphics input facility. Since the viewdata signal is at audio frequency, it can be recorded on magnetic tape and replayed later. In fact the receiver itself has a frame retention facility so that the last frame selected can continue to be displayed when the telephone has been disconnected. Domestic equipment, and perhaps many business sets, will have auto-dialling, which not only rings the nearest computer, but also identifies the terminal for accounting and record purposes. A print-out attachment will also be available commercially.

The television rental companies will probably play a major role in the early days of the public service, in view of the outlay involved in purchasing a modified television. The combination of a Post Office modem in a commercial television does seem to present problems with regard to who is going to service the equipment.

Information Industry

By mid-1978, over 160,000 pages had been booked by about 150 information suppliers, though by no means all of these have actually been utilized. The ratio of domestic:business data bases is about 2:1, though the initial market for Prestel is seen as the business environment, who are already accustomed to paying for information. Among the 150 companies and organizations involved in the pilot trial and test service are[13]

Consumers Association
Institute for Scientific Information
International Publishing Corporation
Fintel (Financial Times/Extel)
Reuters

The information can be input either directly by keyboard, or by magnetic tape input. Graphic displays, such as maps, diagrams and trade-marks can be produced either by dot matrices or by capturing the design using a video camera. Red, yellow, green, blue, cyan, magenta and white colours can be used to enhance the image. Using these colours there is no need to allow space between paragraphs, and important information can be highlighted. This may cause problems to users with the smaller monochrome sets. Another display feature is the option of making items of information flash on and off. In view of the high cost of the input equipment, especially for

graphic displays, and the need for some degree of skill in formating the display, it seems likely that a number of bureau operations will be set up to provide input facilities for the small publisher and so on. Since pages can only be booked in blocks of 100, there is also scope for a bureau to acquire blocks of pages and sub-lease them. The contract between the Post Office and individual information suppliers gives the suppliers total freedom to put what information they like on to Prestel, so long as they agree to indemnify the Post Office against any legal action. As well as pages containing information, advertisements can also be displayed.

The information in a data-base can be updated as often as the supplier requires. By calling up either the complete file, or an individual page, the complete data-base can be updated or just a single figure, such as the cost of a publication.

With the widespread adoption of computer-controlled photo-typesetting, many organizations already have information in a machine-readable format. A number of companies are working on software packages to reformat this information for direct input into Prestel. The National Computing Centre, on behalf of the Department of Industry, is providing funds for the development of these packages, such as the Preview package provided by Langton Information Systems.

The interactive nature of Prestel means that the user can ask for more information on a particular product, order the product, and eventually pay for it via Access or Barclaycard. The information supplier will be able to obtain lists of customers in either hard copy or magnetic tape format. Because of the regional distribution of the computers, it will be comparatively easy to provide these lists in a geographical sequence.

Costs

There are a number of cost elements in the Prestel service. These are:

1. The cost of the television, which in the short term is predicted to be around £600–700 for a domestic set, with a rental charge of around £18 per quarter. These figures will obviously be reduced as demand increases.
2. An installation fee.
3. The cost of the telephone call, plus a duration charge.
4. A charge of 0·5p per frame viewed, levied by the Post Office. This charge is levied on every frame, excluding index frames. However, the information supplier can absorb this charge, making the frame available free to the user.

5. A charge per frame levied on the user by the information provider. This charge must be displayed on the frame, and can be set at any price from zero upwards.
6. The information providers will be charged by the Post Office on tariffs which reflect the rate at which the provider wishes to update the information on his file.

Discussions are still taking place between the Post Office and the Association of Viewdata Information Providers on the charge structure, and no final decisions have yet been made. In particular the frame charge may be replaced by the duration charge.

Search Strategy

The basic search strategy of viewdata is a tree-hierarchy. On accessing the system, the subscriber is presented with an index page classifying the data bases available in up to nine categories. If the subscriber wishes to see information relating to business, he may press (say) 3, to bring up another index page offering more choices. After perhaps three or four index pages he will be led into a specific data-base. Having identified pages of interest a subscriber can, in future, go direct to these pages by pressing the appropriate keys on the keypad. However, individual frames, which have a letter suffix of A to Z after the page number, cannot be selected using the basic numeric keypad, and so the subscriber has to use the frame roll-on facility to reach the required frame. Each intermediate frame costs 0·5p regardless of whether it is actually viewed. In order to overcome the limited choice of 0–9 it is possible to use two digits, e.g. 23. In this case, a subtree is used, and page 2 is first selected, with choice 3 on that page being automatically displayed. Again the intermediate page has to be paid for, though in this case, it would probably be by the information supplier.

One of the problems inherent in a tree structure to access the information files is that the subscriber, by inadvertently choosing the wrong page, especially early on in a search, may in fact move farther and farther away from the information he needs. This can be overcome to some extent by providing cross-references both to pages within a given data-bank, and to other related data-banks. In addition, a published index of data-bases, and appropriate page numbers, will be made available, and no doubt the suppliers will advertise their own page numbers in their hard-copy products and in display advertisements.

The design of suitable algorithms is of crucial importance in making information quickly available at a minimum cost. At present, these algo-

rithms seem to be designed on a rather empirical basis. At a recent conference, a speaker from ABC Travel Guides said that it took about a year to get even a limited range of timetables up on Prestel.

Prestel

A pilot trial with seventy information suppliers and a few hundred users started in 1976. The next stage was to have been a large-scale trial starting in mid-1978 with 1,500 subscribers selected to provide a statistically valid sample population, and living in certain areas of London, as well as Birmingham and Norwich. Now that the decision has been taken to start the public service in 1979, this market trial has been reclassified as a trial service. The investment by the Post Office in this trial service is £5 million, with a further £18 million allocated to the inaugural public service in 1979.

Projections for the future expansion of Prestel are still rather vague. The Post Office have sufficient computing power to accommodate 60,000 subscribers for 1979. ITT see a market for 2·5 million sets over the next five years. Certainly everyone involved with Prestel sees the company subscriber as the initial market. One of the problems is how to promote Prestel. At present it suffers from a lack of identity because of the wide range of information that could be accessed using the service. A user will acquire a suitable television only if he is sure that he is going to be able to make use of it. Because of the high capital outlay, the rental companies obviously have a major role to play, not only in making the television sets more easily available, but in effect launching Prestel to the general public.

Other Viewdata Services

At this stage it must be emphasized that viewdata is a generic name, and that Prestel is the British Post Office public service. A number of other services are being planned. The first of these is to make certain databases, or sections of a data-base, available to a closed-user group (CUG). Access to the restricted information would require a special authorization code, and there is thus the option of different charge rates being levied for the use of this information.

Other countries are also interested in providing a viewdata service, notably Germany, where the Bildschirmtext operation is due to start up in 1980 and Holland, Japan and Finland are also beginning pilot trials on viewdata systems.

France is developing its own Antiope teletext system, which operates on a different protocol to Prestel, thereby giving rise to the problem of which protocol should be adopted by the European Broadcasting Union. There is

considerable interest from the USA. The National Enterprise Board's Insac Data Systems has set up Viewdata Systems International to market viewdata abroad. Viewdata can also be utilized to provide internal informations networks for companies and organizations.[14] Already Philips have developed software to allow its P400 range of minicomputers to be accessed by standard television sets.

Viewdata and the Information Profession

Prestel viewdata has considerable implications for libraries and information units as both users and providers of information, and interest has grown rapidly over the past year. The BL has recently funded two projects concerned with viewdata.

In the first of these Langton Information Systems studied the feasibility of using viewdata as a technique for accessing BL data bases. Seven different data-bases were selected for detailed study; of these, five were selected as sample data bases and a few simulated pages of each were mounted as a demonstration. The study team concluded that it would be feasible for these data-bases to be accessed using viewdata and its hierarchical method of storage but that for certain of the applications magnetic-tape input (and later computer-to-computer communications) would be needed.[14]

The research is to be taken further with a contract of up to £2,500 to Langton Information Systems for investigating the problems associated with mounting larger-scale data-bases on viewdata. Part of the research will be aimed at establishing and setting up in time for the Post Office public test service a full-scale data-base which will be regularly maintained and changed at weekly intervals. This will enable users' reactions to viewdata, as a technique for accessing this type of information, to be ascertained. The BNB Weekly List has been selected as the most suitable data-base.

The second project concerns the use of viewdata in a wider context. An award of £22,050 over two years has been made to the Library Association to carry out a joint investigation with Aslib into the use of viewdata in public libraries and community information services. The project will be based on six libraries in the Post Office test areas—Birmingham, Norwich and London. In the first part of the project the team will assess the use of viewdata terminals in public reference libraries. In the second part of the project they will attempt to assess viewdata's potential as a conveyor of community information.

In evaluating Prestel as an information service the following points should be borne in mind:

1. Viewdata and teletext are not competitors. Teletex will continue to provide a service of information of national importance free of charge to viewers.
2. The updating facility may be more of a hindrance than a help, since it may not be clear when the last update was carried out. This is of particular importance in the business environment, though the scope to provide business and commercial information with little delay may have implications for the use made of 'economic' data-bases on the conventional on-line services, which usually up-date weekly.
3. Existing modems and VDUs cannot be used, though this restriction may be lifted in the near future.
4. The search strategy is designed to be easy to use by the general public, at the expense of retrieval speed and relevance.
5. Because a very high percentage of material will be generated for viewing on colour sets, readability on small monochrome sets may be poor.
6. The question of who services the equipment does not seem to have been resolved. Will it be television service engineers, Post Office engineers, or in-house computer staff?
7. Hard-copy print-out equipment may initially be expensive.

These are rather negative comments. On the positive side, viewdata services offer information scientists and others a number of opportunities. These include:

1. The ability to hold private files of information at low cost.
2. The chance to provide a total (i.e. not just scientific) information service to a company.
3. The opportunity for making senior managers aware of both the value of information, and the merits of on-line, interactive computer-based information services.
4. The possibility of document transmission using video cameras and high data-rate transmission.
5. The chance to assist a company in the design of its input into Prestel, in terms of both the systems design, graphic display, and input and output methods.

On the domestic front, there are three main problem areas.

1. Will the general public pay for information?
2. Will they be able to use it effectively?
3. Will the pressures of electronic games, video-cassette recorders, video disc equipment and four TV channels mean that no one has time to use Prestel?

Future Developments

At this early stage, when the commercial success of Prestel is still in doubt, it is difficult to give more than an indication of future developments. Some of the obvious possibilities are:

(a) Intelligent terminals so that subscribers can store selected pages of information.
(b) Portable terminals, and possibly miniature terminals such as the Sinclair Microvision set.
(c) Public terminals in libraries and Consumer Advice Bureaux.
(d) Establishment of national and international networks.
(e) Higher resolution screens using an 80 characters/line rather than the current 40 characters/line.
(f) Picture transmission using high speed data transmission techniques such as optical fibres with a 2M bit/second capability.

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References

1. S. Fedida, *Wireless World*, **83** (1494), 1977, pp. 32–36.
2. S. Fedida, *Wireless World*, **83** (1495), 1977, pp. 52–54.
3. S. Fedida, *Wireless World*, **83** (1496), 1977, pp. 65–69.
4. S. Fedida, *Wireless World*, **83** (1497), 1977, pp. 55–59.
5. S. Fedida, *Wireless World*, **84** (1508), 1978, pp. 44–48.
6. S. Fedida, *Wireless World*, **84** (1509), 1978, pp. 73–76.
7. S. Fedida, *Wireless World*, **84** (1510), 1978, pp. 75–77.
8. S. Fedida, Viewdata—An interactive information service to the general public. Post Office Telecommunications Research Dept. *Report* 553, Post Office Research Centre, Martlesham Heath, Ipswich, 1976.
9. H. Q. N. Davis, Survey of teletext transmission systems and Mullard decoders. *Mullard Technical Communications, No. 134*, 1977, pp. 143–158.
10. K. E. Clarke, Developments in the Post Office viewdata service. *Television*, **17** (5), 1978, pp. 49–53.
11. A. E. Cawkell, Developments in interactive online television systems and Teletext information services in the home. *Online Review*, **1** (1), 1977, pp. 31–38.
12. M. MacCafferty, Fax and teletext. *Bibliography Series No. 5*, Aslib, London, 1977.
13. Viewdata—a review and bibliography. *Online Review*, **2** (3), 1978, pp. 217–224.
14. Langton Information Systems Ltd, Study of in-house use of viewdata by organizations. *BLR&D Report 5384*, 1977.